

(1) Mulsant [1846] *Sécur.* p. 39 gives the following general differentiation;—

“♂ Premier article des tarsi antérieures ovale, sensiblement plus large dans son milieu que le deuxième article, garni de ventouses en dessous.

“♀ Premier article des tarsi antérieures subparallèle ou faiblement rétréci d'avant en arrière, plus étroit que le deuxième article, dépourvu de ventouses en dessous.”

And on p. 41, adds the following particular differences:—

“Tête triangulaire; subperpendiculaire d'un flave fauve (♂) ou noire (♀) sur le labre; parée sur le vertex et la partie postérieure au front d'un bandeau noir, ordinairement bidenté en devant; blanche sur l'épistome et la partie antérieure du front; souvent marquée de deux points ou traits noirs (♂) réunis en une tache presque carrée, isolée ou liée avec le bandeau noir précité (♀). . . cuisses noires; les antérieures en partie d'un fauve flave (♂). Jambes de la première paire entièrement de la même couleur (♂) ou obscures sur l'arrête (♀). Les suivantes en partie noires. Tarsi roussâtres avec l'extrémité et les ongles noirs (♂ ♀).”

(2) Thomson [1866] *Skand. Col.* Tom. viii. p. 340:—

“Mas: tarsi anterioribus articulo 1: o fortiter ovali: dilatato: femoribus anticis subtus tibisque totis ferrugineis.

“Femina: segmento 6: o medio striga impressa.”

(3) Bedell [1892]. *L'Ab. Journ. d'Ent.* T. xxviii. No. 1, p. 10. Note on *C. mutabilis*:—

“L'épistome, entièrement blanc chez les mâles, porte, chez les femelles, deux points noirs fréquemment confluentes. Les trochanters et le dessous des fémurs antérieurs, ordinairement roux chez les mâles, sont noirs chez les femelles.—L.B.”

(4) Ganglbauer [1899] *Käf. Mitteleur.* III.:

As to the head:—

“Der Kopf gelb mit einer breiten, schwarzen, meist zweilappigen Querbinde auf dem Scheitel und beim ♀ auch mit einem viereckigen, bisweilen in zwei Längstreifen aufgelösten Fleck auf der vorderen Partie der Stirn.”

As to the tarsi:—

“Die Vorder—und Mitteltarsi, rothlichgelb, beim ♂ oft nur die Aussenseite der Vorderschenkel schwarz.”

(5) Fowler [1889] *Col. Br. Isles*, III. p. 159:—

He distinguishes (inter alia) *H. variegata*, Goetz., from *H. 13-punctata*, L., by the first joint of the anterior and intermediate tarsi of the former being dilated in the male. On p. 160 Fowler adds that the male has the first joint of the anterior tarsi oval and dilated.

A few Notes on Orthoptera in Croatia.

By MALCOLM BURR, D.Sc., F.E.S.

In spite of the splendid summer, I have had practically no opportunity of collecting this season, but been able merely to make a few notes and observations on the commoner species.

Every evening in the late summer, walking home from Zagreb along the Pantovchak, a road on a hill covered with villas and vineyards, I was greeted with a chorus of *Conocephalus mandibularis*, Charp., *Phasgonura viridissima*, L., *Pholidoptera griseoptera*, De G., and *Ephippigera vitium*, Serv. The first has a strong and persistent note, recalling that of *Omocestus*, but with a distinctively locustine timbre. I never heard it chirp before dusk: it sits in thick grass, in hedges, or vines: at the bottom of the garden there is a sluggish brook, with rank and reedy herbage where this species is fairly numerous, and this was the best place to catch it: I took one or two, which seem slightly smaller than those which I have captured in France and Spain. Its near relative, *Xiphidium fuscum*, Fabr., is numerous in the same place, and its stridulation is similar but proportionately weaker, and it requires patience to detect. This species I have always associated with reedy places, edges of brooks, etc., much as its northern brother *X. dorsale*, Latr., but its other brother, *X. hastatum*, Charp., with its extremely long ovipositor, I found in Serbia among scrub on dry chalky hillsides.

P. viridissima, L., is persistent: it is noticeably more vigorous in these southern latitudes than in England. I have noticed that in the hot southern sun in the Transcaucasus in the afternoon it will often take to wing, as though from sheer "joie de vivre," which I have never known it do in England, where perhaps the sun is never strong enough to tempt it to this feat; with its long straggling legs, and ovipositor, it has an odd appearance in flight. In southern Europe, too, it is fond of climbing up trees to carry on its vespertine concert, which I have never noticed in England; even on the street-side trees in the town and in gardens it is a usual occurrence to hear his unmistakable song on warm summer evenings and nights. I have never noticed *Conocephalus mandibularis* to do this in Europe, though in Brazil I have heard members of this genus very persistently stridulating at night in trees, as does *P. viridissima* down here. He was common enough in trees, chiefly oak, in the artificial forests along the valley of the Drave, near the village of Pitomacha: I heard both these two species for the last time on October 15th, both on the Pantovchak.

Pholidoptera griseoptera behaves exactly as in England. On the Pantovchak near Zagreb and near Pitomacha, one can always hear his characteristic *tss tss* in the evenings, beginning just before dusk, and carrying on till late at night. The latest date when I observed him was October 16th, on the Pantovchak.

Ephippigera vitium, Serv., is an interesting species. This group is extensively represented in northern Africa, especially in Algeria and Morocco, but is particularly developed in the Iberian Peninsula. Some species extend through France, one or two in Italy, and two reach the coast of Dalmatia. But this species ranges throughout central Europe. It occurs, as a rarity, in Belgium, and I have found it commonly in Normandy. Had it occurred in England, it is so prominent and so strange a creature, that it could not have escaped the attention of our British entomologists for so many years, so the presumption is that it has extended its range northwards from the distributing centre of the group, in south-western Europe, as far as Belgium and Normandy after Britain was separated from the

Continent, and that the common Praying Mantis and common Stick Insect are missing with us for the same reason. The Ephippigerids have one feature very distinctive from almost all other Orthoptera: the stridulating organs are equally well developed in both sexes, and, moreover, they chirp with rage when seized with the fingers. The stridulation has a peculiar squeaky timbre which is unmistakable once heard. I was surprised to hear it along the road from Topchider to Rakovitsa in Serbia, near Belgrad, for I never expected to find a representative of this genus in the Balkans, excepting the coastal strip of Dalmatia, where I have taken *E. kraussi* and *E. sphacophilus* from Istria to the Bocche di Cattaro. Another peculiar feature about their stridulation is that they are noisy in the morning, which is unusual with Locustine Orthoptera, become silent in the afternoon and strike up again in the evening and keep it up late. The latest date I have recorded is October 15th on the Pantovchak.

In the dell at the bottom of my garden, between the Pantovchak and the Tushkanats, *Gomphocerus rufus*, L., is common enough on the slopes running down to the brook. The last specimens I saw there on October 10th, when I found *St. bicolor*, Charp., *Ch. parallelus*, Zett., *Platyphyma giornae*, Rossi, and *X. fuscum*, Fabr. *P. giornae* is always very prominent in the autumn in southern Europe, as he frequents open dry places, where he is easily seen; he lingers on in some numbers right up to the winter, when almost all other Orthoptera have disappeared, and the appearance of the numerous pairs hopping about together *in copula*, the very small male on the back of the mate who is twice his size, like so many little frogs, attract the eye. Other species in my garden were *Omocestus rufipes*, Zett., and *O. viridulus*, L., but not very numerous, *Acrotylus*, probably *insubricus*, Scop., and *Oedipoda caerulea*, occasionally seen, an occasional *Caloptenus italicus*, L., and *Acrydium bipunctatum*, L. In Maximir Park, near Zagreb, I found *Ch. elegans*, Charp.

At Pitomacha, a village in the flat valley of the Drave, where everything is cultivated and artificialised, I came across little to add to this list. There are plenty of marshy fields there, dried up by the drought, and at Sedlaritsa, 9 km. further south, on the edge of a great forest. In these swampy fields *Mecostethus grossus*, L., *Chorthippus parallelus*, Zett., and *Ch. dorsatus*, Zett., are common. *Acrydium subulatum*, L., was common in a wood, *Ph. griseoaptera* in the hedges and *Phasg. viridissima* in the oaks.

As to Blattids, of course, *Blattella germanica*, L., is a "common object of the restaurants" in Zagreb, but I came across no other species. As to crickets, the Mole Cricket may usually be heard chirping on warm summer nights; I have noticed him at Pitomacha and near the Okrugliak, just outside Zagreb. *Gryllus domesticus*, L., chirruped away cheerfully in the vicarage at Pitomacha, and *G. campestris* resounds all the spring and late summer, throughout the countryside. It was still busy at Pitomacha on October 4th, and round Zagreb on the Pantovchak as late as the 22nd. On the 4th, at Pitomacha, in a wood, there were minute Gryllid larvæ, which I think may well have been those of *Nemobius sylvestris*, Fabr. On October 22nd, a female *Phaneroptera fulcata*, Scop., flew into my bedroom, attracted by the light. On the 16th, a bright sunny Sunday afternoon, in a clearing by some big woods near the Pantovchak, *St. bicolor*,

Charp., *Pl. giornae* and *G. rufus*, L., were both abundant and active, as though in midsummer, and I flushed *O. caerulescens*, and it did one good to see the blue flash of his wings when one knew winter was almost upon us, especially as the previous afternoon I had been down to the bottom of the garden and found no Orthoptera left. But the final goodbye to this long and splendid, but to me, entomologically speaking, wasted, summer, was on October 23rd. This was a warm day, but the sky was rather overcast and the long-awaited rain seemed to be coming at last; there was a gusty wind and the dust was unpleasant. Still, we were able to lunch in the open air, and out for a stroll I picked up *St. bicolor*, a few pairs of *Pl. giornae* and a female *Caloptenus italicus*, L. That night there was a violent thunderstorm, and we looked out of the window next morning to see the countryside under a thick mantle of snow.

Later notes:—On the morning of 26th I found a belated male *Phaneroptera falcata* in the house, seeking refuge from the winter outside.

On 28th, a week after the first snow and several cold nights, I heard *Eph. vitium*, a single specimen, chirping as though to keep himself warm, after dark. This very late date shows what a hardy species this is, and helps to explain the fact that it is the only member of this family to extend beyond the boundaries of its warm, original home, in the Western Mediterranean countries, to Central and Western Europe.

November 1st.—The summer has returned; once more lunch in the garden, and on a sunny hillside found *St. bicolor*, *St. elegans*, *Gomphocerus rufus* and *Pl. giornae*, the first chirping away busily, for sheer light-heartedness, the mating season being long over.

Notes on *Zygæna rubicundus*, Hb.; *Z. erythrus*, Hb., and on the races of *Z. purpuralis*, Brünn, in Europe.

By ROGER VERITY, M.D.

This little group of species is interesting because it constitutes one of the extreme variations of the *Zyganæ*, that in which the nervural pattern exists alone. The result is that also the red markings of the secondary pattern form bands parallel to the neurulation and are never divided up into spots, as in most species of the genus. A vestige of the true or transverse pattern only occurs exceptionally in very dark individuals of the male sex found in the northern races of *purpuralis*: form *semaculata*, Burgeff, in which the median and the posterior red bands are each divided in two. In *erythrus* there occurs the very rare *verityi*, Stefanelli [*Bull. Soc. Ent. Ital.*, lx., p. 255 (1909)], in which the median band is thus divided.

That these three species are perfectly distinct there can be no doubt, their larvæ are quite distinct from each other; that of *rubicundus* was discovered by Querci and described and figured in Oberthür's *Études de Lépidopt. Comparée*, v., fig. 824, and vi., p. 164. The imagines also bear constant differential features. *Z. rubicundus* always has white legs in both sexes and a white collar and epaulettes; these characters are only met with in the female of *erythrus* and very rarely and to a slight degree in that of *purpuralis*; in *rubicundus* the